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AUTHOR Kontos, G.; And Others
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ABSTRACT

Distance education and related technologies make possible the sharing of information and techniques between countries to improve teaching and learning for all students, including those with special needs. Distance education delivery tools include computers, phones, and, more recently, compressed video. These tools have been used in the United States and in other countries, including Costa Rica. In that country, online communications techniques and computers are utilized to develop creativity, logical thinking, and a new attitude of preschool and elementary level students towards technology. Students with special needs are especially helped by the technology. Some of the current and future applications of distance education technologies for this category of students are described. (Contains 21 references.) (Author)

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TECHNOLOGY IN THE SCHOOLS: OVERCOMING OBSTACLES

by

G. Kontos

G. Ramirez

W. Cegelka

U.S. DEPARTMENT OF EDUCATION
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ABSTRACT

Distance education and related technologies make possible the sharing of information and techniques between countries to improve teaching/learning for all students including those with special needs. Distance education delivery tools include computers, phones, and more recently compressed video. These tools have been used in the United States and in other countries, including Costa Rica. In that country online communications techniques and computers are utilized to develop creativity, logical thinking, and a new attitude of pre-school and elementary level students towards technology. Students with special needs are especially helped by the technology. Some of current and future applications of distance education technologies for this category of students are described.

INTRODUCTION

Before the 90s, we were talking about the impact of technology in the classroom. In the 90s we are looking at how technology can be used to enhance and expand the traditional classroom. This is made possible by the various distance education supportive technologies. Simply stated, distance education occurs when the instructor and students are physically distant from one another (Keegan, 1986; Verduin and Clark, 1991).

In recent years, the issue of the availability of

educational programs to students, and especially to adult learners, has come to the forefront. Business leaders are concerned that higher education is unlikely "...to move quickly and effectively enough to meet the recurrent, lifelong education and training needs of our increasingly older and diverse population" (Greenburg, 1990). Moore (1988) asserts that it is desirable "... to provide educational access for students who would not have the opportunity to undertake education through residential programs. These 'distant' learners include those whose job demands, family responsibilities, and other time constraints make traditional educational access unavailable" (p. 7).

Distance education, a term used to describe education delivered away from campus, has been around in one form or another for the last century. However, today's technology, particularly computers, information systems, and telecommunications, have begun to replace the old concept of "extension courses" and other similar off-campus delivery systems. The new and emerging electronic technologies are ideal for delivering the knowledge to the people rather than bringing the people to the knowledge.

Distance education is a field of education that has grown enormously over the past decade. There are some good reasons why interest in distance learning is increasing. According to Campbell (1995),

An important element of cost for school-based learners is

> the overhead of physical facilities and support personnel on campus. This and the need to reach learners when and where they need assistance, and the potential economies of scale are some of the reasons that interest in interactive distance learning is exploding. (p. 34)

There is little doubt that the effects of distance education have been in the positive direction; however, little is known about the exact nature of the various interactions of delivery approaches, media systems, and instructional methods. As Moore (1989) points out:

> The weight of evidence that can be gathered from the literature points overwhelmingly to the conclusion that teaching and studying at a distance, especially that which uses interactive electronic telecommunications media, is effective, when effectiveness is measured by the achievement of learning, by the attitudes of students and teachers, and by cost effectiveness. (p. 30)

DISTANCE EDUCATION IN THE UNITED STATES

In 1987 fewer than 10 states were actively engaged in distance education in the United States. In the early 90s, spurred by federal and state grant programs, most states were involved in distance education programs at institution, system, and state levels (Willis, 1994). About 45 states were sharing distance education programming across state borders, and a number of higher education institutions were sharing programming across

national borders (Doan, 1991; Lowery, 1991).

Nova Southeastern University (NSU) is among the most successful U.S. schools that promote and practice distance education programs. NSU is fully accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (SACS). The efforts of NSU and similar educational institutions have recently resulted in the emergence of terms like cyberschool and online education. A "cyberschool" (cyberspace school) may loosely be defined as a school that offers degrees via distance education, in particular online (with the use of computers and modems) education. Cyberschools have already come and gone in the last decade (Stucky, 1995).

At NSU, the delivery of graduate programs by distance education began in 1972 using current technology: the telephone and jet planes. In 1983, the University began to offer graduate education programs through interactive electronic telecommunications (i.e., distance education). Online, electronic delivery of instruction was offered in the doctor of arts in information sciences and in the doctor of education in computer education programs. In 1991, the Child and Youth Studies doctoral program adopted many of these distance education techniques to create their own alternative, electronic delivery system known as the "National Cluster."

Also beginning in 1991, the Graduate Teacher Education Program (GTEP) provided a new instructional mode at NSU by offering facilitated classes that used a combination of audio

teleconferencing discussions, individual phone calls, and a local facilitator. This included computer augmentation of the audiobridge, such as subgrouping and polling, during the teleconference.

In subgrouping, the instructor breaks the class into small groups to discuss topics, one topic per group. The instructor uses the computer keyboard to move from group to group to facilitate discussion. When it is time to bring the whole class together again, the instructor notifies the audiobridge operator. Polling is another audiobridge discussion tool that allows all students to participate simultaneously. The instructor poses a question and gives the students a choice of responses. The instructor sees the students' responses on the computer screen and initiates discussion based on those responses.

Distance education programs at NSU, operating online on a Unix mainframe, use personal computers for online electronic communications, and computer conferencing. Specifically, these programs encompass interactive, online, computer discussions (synchronous and asynchronous) with faculty members; electronic mail conversations; electronic assignment delivery; and online examinations. Much of the work on assignments is done offline by the student and then uploaded to the student's home directory, from which it can be electronically mailed to instructors. An innovation to encourage real time interaction in distance education programs that has been successfully developed at and implemented by GTEP and other departments in NSU is the

"electronic classroom."

The electronic classroom (ECR) program simulates a traditional classroom setting, blackboard and all. The ECR can be scheduled and used by faculty to discuss assignments, concepts, controversial issues, or just to hold a "rap session" with students while on line. While in an ECR session, the computer screen is split into an instructor's window (a 16-line "blackboard"), and a 4-line student window. An online tutorial shows first time users how to ask the instructor questions, how to get help, and how to prepare questions in a buffer which they may subsequently display when called on by the instructor.

In 1994, GTEP started using compressed video as another mode of interactive, online instruction. Compressed video is an alternative to "high-tech" (and high-cost) interactive television (ITV) systems that offers equivalent educational effectiveness at a lower cost. Two-way audio and video signals may be transmitted to multiple sites. Currently, linked NSU sites are in Florida, Arizona, and Nevada; these have made interstate compressed video instruction possible. Using compressed video, the instructor can teach a "live" class at one site while connected to one or two other classes at distant locations.

DISTANCE EDUCATION TECHNOLOGIES IN OTHER COUNTRIES

Granger (1990) commented:

> From Britain to Thailand, Japan to South Africa, distance learning is an important part of national strategies to

> educate large numbers rapidly and efficiently. ... "Distance learning," as a term associated with new technologies offering a full-fledged alternative to classroom education, got its biggest boost internationally with the founding of the British Open University (BOU) in 1969. ... Since then, new government-supported "open universities" in other countries have been established at a rate of about one every two years, with at least three more in the planning stages. (p. 45)

Distance education is used worldwide. Africa, a continent of contrasts, has approximately 70-80 institutions that provide distance education service while in Asia more than 100 major institutions and countless smaller ones have distance education courses and programs (Willis, 1994). Although Europe and North America (United States and Canada) are very advanced technologically, Central and South American countries have also made considerable progress. Willis (1994) in his book Distance education: Strategies and tools devotes an entire chapter on distance education around the world.

Costa Rica, a Central American country, has initiated the "Computer Education Program" (Programa de Informatica Educativa). This Program involves 160 different schools from rural and marginal urban areas from all over the country for an average of 160,000 children that represent the 30% of the active school population. It is jointly being developed and financed by the Omar Dengo Foundation and the Ministry of Public Education since

1988. The Omar Dengo Foundation (FOD) is a private, non-profit organization created by a group of Costa Rican professionals, to contribute to the efforts of the Ministry of Public Education (MEP) to improve the quality of education in Costa Rica.

The Computer Education Program's main objective is to utilize computers as educational tools to develop creativity, logical thinking, and a new attitude towards technology. It is directed toward pre-school and elementary level students in Costa Rican public schools. The Program aims at developing a new generation of Costa Ricans whose creativity and analytical skills enhance their ability to face the future. In addition, it seeks to provide equal access to information technology.

The Computer Education Program selects the schools where the laboratories are to be installed. In order to have access to a computer laboratory, the community in which each school is located must provide a fully furnished classroom, electrical installations, security, courses and activities for parents and other community members after school.

The Program objectives are to:

1. Familiarize the student and the educator with computer use applications.
2. Stimulate the learning process, creativity and analytical skills.
3. Contribute to the scientific and technological development of the country.
4. Complement the teaching-learning process in basic subjects.

5. Rekindle Costa Rica's educational live by stimulating a process of renovation.

One of the projects that the Program has is the recently launched Educational Telecommunication Network. The Educational Telecommunication Network has two general objectives:

1. To provide the school environment with a new communications tool in order to breathe life into the learning process and to carry that learning process beyond the classroom by providing students and teachers with access to recent scientific information and other technologies.
2. To facilitate the communication between computer labs with the goal of strengthening the development of the children's cognitive process, as well as providing a cultural exchange, and supporting the learning of foreign languages.

One hundred twenty seven of the 160 schools already have access to Internet through the Network. This technological innovation is important to give Costa Rican students and teachers the same opportunity to use up-to-date scientific information and other technological resources that they already have in developed countries, in order to close the learning gap between them.

Furthermore, the Network enriches the school environment by improving the quality of learning resources and bringing technologies into the classroom, such as data bases, computer imagery, and new innovative software among others. The Network also facilitates the sharing of ideas and information among students and teachers and can virtually bring the knowledge of

experts in many fields from around the world into the classroom.

The Network could equally be powerful for motivating teachers and shaping their attitudes so that they become active "guides" for children, by putting them in charge of their own learning process and by abandoning their traditional role as merely receptors of knowledge.

Among the many new activities the lab teachers are developing is the daily checking of e-mail in order to determine the possibilities for working on domestic and international projects in accordance with the needs and interests of the different children's groups.

The benefits of this project are already materializing. Ninety-five thousand children from rural and marginal urban areas and two hundred fifty elementary school teachers are now connected to the Network. This project will be expanded as the national telecommunications company provides us with new telephone lines that will eventually connect all 160 schools.

Some of the ways children and teachers can participate in the Network are:

* In forums on pedagogical issues.
* In different interest groups.
* By accessing new information from different data bases.
* In long distance workshops.
* In forums on domestic and international problems, the LOGO language and other issues.
* In group projects where children try to solve a common

problem.

* Creating and producing newspapers and magazines.
* In scientific projects with national and international experts.

Various projects are being been developed by schools on the net. In one such project, the Electronic Magazine, children from the entire country will develop an electronic magazine. The children themselves will be in charge of the whole process, be coordinated by e-mail.

Three groups will interact here:

1. Editorial Group: It will be shaped by children from the whole country. It will have a coordinator. This group has to discuss with everybody involved in the process all the related things with the magazine. For example: Sections, quality, logo type, number of articles by section etc.
2. Advisor Committee : This group will be shaped by teachers, writers, and all those adults and professionals who want to cooperate with children with suggestions, but without taking the children's place.
3. Writers: This is a group of children who will have to produce the articles for the magazine.

All these activities will be coordinated through an electronic forum with the participation of these three groups of people.

The ultimate goal of the Program of Costa Rica is to give children the opportunity to develop their own imaginations,

problem solving abilities and creative capability. In doing so, we can be sure of creating a generation of leaders capable of carrying this country into the future.

DISTANCE EDUCATION FOR SPECIAL NEEDS AUDIENCE

Students with special needs may choose to participate in distance education rather than traditional education for a variety of reasons (Niemi, 1987). Three reasons will be discussed in this paper: flexibility and convenience; lack of appropriate instructional alternatives; and as an alternative to mainstream or traditional education.

Flexibility and convenience. Special needs learners often view flexibility and convenience as major reasons for enrolling in distance education programs. A potential audience consists of people, such as those living in rural areas or suffering disabilities, without easy physical access to campus-based schools (Stucky, 1995). Physically handicapped adults whose mobility, vision or hearing are impaired may have difficulty attending and participating in traditional on-campus classes. Since technology offers them flexibility and convenience in the learning process, such as, the location and time of learning, these learners are afforded the benefits of an education they might not otherwise be able to attain (Holmberg and Bakshi, 1992; Shapiro and Hughes; 1992).

Nova Southeastern University provides every student with a computer and modem access to E-mail, the Internet, the Electronic

Library and other services. Using these resources a student can obtain state of the art information, current research and best practices from his or her computer work station.

Lack of appropriate instructional alternatives. Learners with special needs, particularly those in rural areas, may choose distance education because of a lack of instructional alternatives. Travel time, lack of appropriate transportation and expense may limit their access to traditional higher education. For some, distance education may provide the only means of receiving a particular class or course of study.

Bradshaw and Brown (1989) report that "an estimated one third of the country's (U.S.A.) school children get an inadequate education because of limited staff and resources related to small school size and geographic isolation" (p.1). This problem is compounded for students with special needs, particularly those in rural areas. To provide students with the classes they need and desire many administrators have turned to distance education.

An alternative to mainstream or traditional education. For some students the chance to operate outside of the educational mainstream is what attracts them to distance education. Many students, especially those with disabilities, have participated in traditional education and have found it to be a less than satisfactory experience. They may have been pitied, psychologically or physically isolated, labeled, and/or segregated from their "regular" peers.

When students participate in computer-assisted learning

activities no one knows that they are blind, have cerebral palsy, or are in a wheelchair. Their peers judge them by their participation in class not by some preconceived notions. Assistive technology also lets handicapped individuals participate fully in the educational experience, more fully than ever before in the history of education. For blind students the computer screen display can be made available in an auditory mode using screen-reading software and sophisticated speech synthesizers, or made available in a tactile mode using a refreshable Braille display which echoes the screen display, or perhaps most dynamically, uses both methods.

Assistive technologies are available for students with low vision, orthopedic handicaps, hearing impairments, and learning disabilities, just to name a few. These technologies and distance education are paving the way for gains in education and employment of the disabled.

Many special education teachers are very enthusiastic about the potential of technology to improve the learning opportunities for handicapped and disabled students (Kearsley, Hunter and Furlong, 1992, p.144). Educators find that computers and multimedia technologies motivate learning, foster increased social interaction, build self-esteem, and give students with disabilities new ways to communicate with the outside world (Holzberg, 1995).

Gisert and Futrell (1995) have identified the special needs of students with disabilities in regard to computers. Parette,

Hourcade, and Van-Biervliet (1993) have shown us how to select appropriate technology for children with disabilities. Morgan (1990) has developed a guide for teachers and administrators who wish to use technology in meeting the needs of students with disabilities, plus tips for selecting software. As our knowledge and research base continues to expand we are finding that technology may genuinely close the gap for teachers and students of all abilities.

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